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REMARKS

In view of the following discussion, the Applicants submit that none of the claims now pending in the application is indefinite under the provisions of 35 U.S.C. §112, anticipated under the provisions of 35 U.S.C. §102, or unpatentable under the provisions of 35 U.S.C. §103. Thus, the Applicants believe that all of these claims are now in allowable form.

I. REJECTION OF CLAIMS 4-22 UNDER 35 U.S.C. § 112

Claims 4-22 stand rejected under 35 U.S.C. §112, second paragraph as being allegedly indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicants regard as the invention. In response, the Applicants have amended claims 4, 6-13, 18, and 22 in order to more clearly recite aspects of the present invention.

Specifically, claims 4, 6-13, 18, and 22 have been amended to correct the antecedent basis issues pointed out by the Examiner. Accordingly, the Applicants respectfully submit that claims 4, 6-13, 18, and 22, as amended, fully satisfy the requirements of 35 U.S.C. §112.

Moreover, claims 5-11, 13-17, and 19-22 depend from independent claims 4, 12, and 18 and recite additional features. As such, the Applicants respectfully submit that claims 5-11, 13-17, and 19-22 also fully satisfy the requirements of 35 U.S.C. §112. Accordingly, the Applicants respectfully request that the rejection of claims 4-22 under 35 U.S.C. §112 be withdrawn.

II. REJECTION OF CLAIMS 1-4 UNDER 35 U.S.C. § 102

Claims 1-4 stand rejected under 35 U.S.C. §102(e) as being anticipated the Yanosy patent application (United States Patent Application Publication No. 2003/0217128, published November 20, 2003, hereinafter "Yanosy"). In response, the Applicants have amended independent claims 1 and 4 in order to more clearly recite aspects of the present invention. Claims 2 and 3 have been cancelled without

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prejudice.

Particularly, the Applicants respectfully direct the Examiner's attention to the fact that Yanosy fails to teach or suggest the novel invention of providing communication support for collaborative applications by forming a communication overlay tree that provides communication links between application server resources and users, via a middleware level, as claimed in Applicants' independent claims 1 and 4, as amended.

By contrast, Yanosy teaches a single intermediary (*i.e.*, an application quality of service (QoS) negotiator) that provides "a primary interface between any application and the QoS middleware layer" (Yanosy at paragraph 0029). Yanosy clearly does not teach that this intermediary has a hierarchical structure (*e.g.*, such as that of an overlay tree). Moreover, Yanosy teaches a system in which a middleware level (*i.e.*, the QoS middleware layer) is an endpoint serviced by the intermediary, whereas in the Applicants' claimed system, the middleware level is the intermediary.

Notably, the Applicants positively claim a method and system for providing communication support for collaborative applications in which a communication overlay tree provides communication links between application server resources and users, via a middleware level. Specifically, Applicants' independent claims 1 and 4, as amended, positively recite:

1. A method of providing communication support for collaborative applications comprising:

abstracting a network and application server resources at a middleware level;

indexing the application server resources in a network aware and application aware manner to reflect positions of the application server resources in an application space;

indexing a plurality of users to reflect communication interests of the plurality of users in the application space; and

forming a communication overlay tree that provides communication links between the application server resources and the plurality of users, via the middleware level. (Emphasis added)

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4. A communication network, comprising:
- a plurality of network resources having network constraints, the plurality of network resources including a plurality of application servers controlled by an application having an application space; and
 - a middleware server connected to said plurality of network resources, including the plurality of application servers, said middleware server for establishing an attribute space based on attribute information that includes said network constraints and on said application servers, the middleware server for indexing the plurality of application servers to reflect their positions in said attribute space, the middleware server further for implementing a communication overlay tree that provides communication links between the plurality of application servers and the middleware server based on network constraints and on the application space.
- (Emphasis added)

Applicants' invention is directed toward a method and apparatus for virtualizing network resources. Current state of the art communication management is usually based on implementing an application-specific network layer mechanism. Such network layer mechanisms are often difficult, costly, and time-consuming to implement and maintain. This is despite the fact that there are numerous similarities in the communication primitives of many application-specific network layer mechanisms. Even when application-specific network layer mechanisms are implemented, most do not take into account the actual network conditions that can and do impact communications.

Applicants' invention relieves applications from the task of explicitly handling all communication requirements by providing middleware communication solutions that manage communications for collaborative applications. Such middleware communication solutions use multiple attributes, such as network conditions, application logic, and application server resources, to establish network communications and to handle heterogeneity in service level agreement (SLA) requirements among applications and users. The middleware communications solutions use these attributes to construct an overlay tree that communicatively links users to application servers. The overlay tree clusters application servers together and routes communications for particular clusters of application servers through particular middleware servers.

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As discussed above, Yanosy fails to teach or suggest the novel invention of providing communication support for collaborative applications by forming a communication overlay tree that provides communication links between application server resources and users, via a middleware level, as claimed by the Applicants' independent claims 1 and 4. Accordingly, the Applicants respectfully submit that independent claims 1 and 4 are not anticipated by the teachings of Yanosy. As such, the Applicants respectfully request that the rejection of claims 1-4 under 35 U.S.C. §102(e) be withdrawn.

III. REJECTION OF CLAIMS 5-23 UNDER 35 U.S.C. § 103

Claims 5-23 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Yanosy in view of the Garcia-Luna-Aceves et al. patent application (United States Patent Application Publication No. 2003/0101278, published May 29, 2003, hereinafter "Garcia-Luna-Aceves"). In response, the Applicants have amended independent claims 4, 12, and 18, from which claims 5-11, 13-17, and 19-23 depend, in order to more clearly recite aspects of the present invention.

As discussed above, Yanosy fails to teach or suggest the novel invention of providing communication support for collaborative applications by forming a communication overlay tree that provides communication links between application server resources and users, via a middleware level, as claimed in Applicants' independent claims 4, 12, and 18. Garcia-Luna-Aceves fails to bridge this gap in the teachings of Yanosy. At best, Garcia-Luna-Aceves teaches that clients are mapped to servers based on network latency (i.e., a "most favored server" is specified for each client). Garcia-Luna-Aceves clearly does not teach that this network latency map has a hierarchical structure (e.g., such as that of an overlay tree).

Notably, the Applicants positively claim a method and system for providing communication support for collaborative applications in which a communication overlay tree provides communication links between application server resources and users, via a middleware level. Applicants' independent claim 4 has been recited above.

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Applicants' independent claims 12 and 18, as amended, positively recite:

12. A method of virtualizing network resources to support collaborative communications in a network having application servers and users that have communication interests, the method comprising the steps of:

constructing a scalable network map;

indexing application servers according to their position in the network;

indexing users according to their communication interest;

generating a communication overlay tree based on the indexing of the application servers, on the indexing of the users, and on the scalable network map; and

supporting communications between application servers and users over the communication overlay tree. (Emphasis added)

18. A method of operating a communication network, comprising the steps of:

identifying a plurality of network resources and their network constraints;

identifying a plurality of application servers that are controlled by an application having an application space;

identifying a plurality of users and a communication interest in the application space of each user; and

indexing the plurality of application servers to reflect their position in an attribute space;

indexing said plurality of users according to communication interests;

forming a user index identifier for each user of said plurality of users; and

establishing a communication overlay tree between the plurality of application servers and the plurality of users based on the identified network constraints and on the indexed plurality of users, the communication overlay tree providing communication links between the plurality of application servers and the plurality of users. (Emphasis added)

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As discussed above, Yanosy and Garcia-Luna-Aceves fail, singly or in any permissible combination, to teach or suggest the novel invention of providing communication support for collaborative applications by forming a communication overlay tree that provides communication links between application server resources and users, via a middleware level, as claimed by the Applicants' independent claims 4, 12, and 18. Accordingly, the Applicants respectfully submit that independent claims 4, 12, and 18 are not made obvious by the teachings of Yanosy in view of Garcia-Luna-Aceves.

Claims 5-11, 13-17, and 19-23 depend, directly or indirectly, from claims 4, 12, and 18 and recite additional features therefor. As such, and at least for the reasons stated above, the Applicants respectfully submit that claims 5-11, 13-17, and 19-23 are also not made obvious by the teachings of Yanosy in view of Garcia-Luna-Aceves. As such, the Applicants respectfully request that the rejection of claims 5-23 under 35 U.S.C. §103(a) be withdrawn.

IV. CONCLUSION

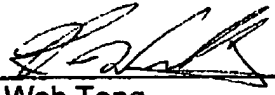
Thus, the Applicants submit that all of the presented claims fully satisfy the requirements of 35 U.S.C. §112, 35 U.S.C. §102, and 35 U.S.C. §103. Consequently, the Applicants believe that all of the presented claims are presently in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

If, however, the Examiner believes that there are any unresolved issues requiring the issuance of a final action in any of the claims now pending in the application, it is requested that the Examiner telephone Mr. Kin-Wah Tong, Esq. at (732) 530-9404 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

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Respectfully submitted,

12/27/07
Date


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